IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit	: 1793	**Customer No.: 035811**
Examiner	: Jie Yang	
Serial No.	: 10/526,916	
Filed	: March 7, 2005	
Inventors	: Yasuhiro Omori	Docket No.: JFE-05-1032
	: Tohru Hayashi	
	: Akihiro Matsuzaki	Confirmation No.: 7535
	: Takaaki Toyooka	
Title	: STEEL PRODUCT FOR INDUCTION	
	: HARDENING, INDUCTION HARDENED	
	: MEMBER USING THE SAME, AND	
	: MANUFACTURING METHODS THEREFOR	
		Dated: January 8, 2009

RESPONSE

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is submitted in Response to the Official Action dated August 12, 2008.

Claims 23 – 30 stand rejected under 35 USC §103 over the hypothetical combination of Asano and Ochi '105 with Ochi '358. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying the combination of publications against the rejected claims. The Applicants respectfully submit, however, that one skilled in the art would not make the hypothetical combination for the reasons set forth below.

Ochi '358 is the primary reference and is stated as disclosing hot working, cooling and induction hardening steps. The rejection frankly admits that Ochi '358 does not disclose the claimed cooling rate of at least 0.2°C/s and the structure of bainite and/or martensite at a total volume fraction of 10% or more. The Applicants agree that Ochi '358 does not disclose the cooling rate of at

least 0.2°C/s and the structure of bainite and/or martensite at a total volume fraction of 10% or more. However, the Applicants respectfully submit that Ochi '358 does not teach hot working.

Instead, the Applicants respectfully submit that Ochi '358 teaches something very, very different. In fact, the Applicants respectfully submit that Ochi' 358 teaches those skilled in the art to avoid hot working and, instead, to employ cold working or, more specifically, cold forging. These teachings can be found throughout Ochi '358 such as in Col. 2 at Lines 28 – 33. That portion of Ochi '358 teaches:

> subjecting a steel comprising the above constituents to annealing, cold forging, machining, and form rolling to form an outer race having a predetermined shape; and then induction hardening the outer race in its shaft including the inner surface of the cup and the involute serration, followed by tempering...

There is no reference to hot working. Instead, there is a clear teaching of cold forging, which is cold working. Then, there are repeated references to cold forging such as at Lines 23 and 47 of Col. 3. Then, there is a very explicit teaching in Ochi '358 of avoiding hot working. That teaching may be found in Col. 6 beginning at Line 38 and extending through Line 48 as follows:

> One of the features of the process for producing an outer race for a constant velocity joint, having improved anti-flaking properties and shaft strength, according to the present invention is that the outer race is produced by cold forging alone without the step of hot forging. By virtue of this feature, cold forging followed by induction hardening can refine former austenite grains and can improve the intergranular strength. Further, forming by cold forging is advantageous in that the strain after forging is small leading to lowered strain in the track grooves of the mouse in the final product.

The Applicants respectfully submit that contrary to the position taken in the rejection which states that Ochi '358 teaches hot working, the Applicants respectfully submit that Ochi '358 teaches just the opposite. In particular, Ochi '358 teaches cold forging. Moreover, not only is there a

teaching of cold forging, but it is clear that Ochi '358 teaches against hot forging or hot working. Therefore, the Applicants respectfully submit that Ochi '358 not only does not disclose the cooling rate and the structure of bainite and/or martensite at a total volume fraction of 10% or more, but it also does not teach the Applicants' claimed hot working.

Ochi '105, on the other hand, does refer to hot forging. Such teachings may be found, for example, in Col. 2 beginning at Line 44 and extending through Line 50 as follows:

> An object of the present invention is to provide case hardening steel with low heat-treatment strain having good grain coarsening prevention properties during carburization, a method of producing the steel, and, with respect to the production of carburized parts produced in the hot forging process...

Therefore, the Applicants respectfully submit that Ochi '105 is perceived in a completely different way from Ochi '358 by utilizing hot forging as opposed to the cold forging only teachings of Ochi '358.

The Applicants respectfully submit that this is important because one skilled in the art would not combine a disclosure that is based on a hot forging process with another disclosure, Ochi '358, that not only is based on cold forging, but explicitly teaches away from cold forging. The Applicants respectfully submit that those skilled in the art would not make a combination wherein the secondary publication is not only fundamentally different from the primary publication, but the primary publication teaches away from the secondary publication.

It is critical to remember that in determining obviousness, that teachings within a publication that lead those skilled in the art away from the primary publication are compelling evidence of non-obviousness. In this case, the primary publication teaches cold forging and cautions against hot forging. On the other hand, the secondary publication is directed to hot forging. The Applicants

respectfully submit that those skilled in the art do not take the teachings from the secondary reference and apply them to a primary reference when doing so would likely destroy a fundamental premise of the primary reference. This would not make sense and, as noted above, represents a teaching away from the secondary reference. As such, the Applicants respectfully submit that the obviousness rejection cannot stand because one skilled in the art would not combine Ochi '105 with Ochi '358.

The Applicants respectfully submit that the further hypothetical combination of Asano becomes moot in view of the fact that one skilled in the art would not combine Ochi '105 with Ochi '358. Thus, the rejection must fail. However, the Applicants respectfully submit that Asano does not provide any disclosure or teachings that would cure the deficiencies of Ochi '105 or Ochi '358.

Contrary to the assertion in the rejection, the Applicants could not find teachings as to "select proper temperature" in the heating of induction hardening in Asano. In fact, Asano only teaches a single heating pattern for heating of induction hardening in which final heating temperature is 1150°C (i.e., quickly heating to 850°C in 0.9 seconds (at more than 900°C/s) and less quickly heating to 1150°C in 1.9 seconds (at about 160°C/s)) (col. 4, lines 47 to 51). There is no disclosure or suggestion in Asano about heating temperature of induction hardening.

The rejection apparently asserts that controlling surface hardness after induction hardening in col. 4, lines 11 to 14 implied selecting heating temperature of induction hardening. In this regard, the Applicants note that many elements are regulated from col. 2, line 49 to col. 3, line 51, and at least C, Mn, B, Cr therein are regulated to control hardenability. Therefore, to obtain the desired surface hardness in col. 4, lines 11 to 14, one skilled in the art could easily select a chemical composition of the steel according to Asano rather than adjusting induction hardening temperature without any guidance.

Furthermore, in col. 2, lines 6 to 12 in Asano, it is disclosed, as essential features, that

(1) high anti-impact strength and rolling fatigue properties are obtained by a combination of:

a hard surface obtained by induction hardening, and

an improvement in resistance to high-temperature softening by the selection of an optimum alloy composition, and,

(2) it is prevented from impairing forgeability and machining processability by a combination of:

forging conditions, and

heat treatment conditions.

Note that the combination of forging conditions and heat treatment conditions for avoiding impairing forgeability (i.e., ensuring high deformability, avoiding buckoing, and ensuring life of mold) and machining processability (i.e., ensuring life of tools) corresponds to the description in col. 3, line 62 to col. 4, line 10 and col. 4, lines 19 to 23. That means, above "heat treatment conditions" means normalizing conditions and does not include heating temperature of hardening.

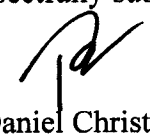
Among the elements mentioned in the above disclosure (i.e., in col. 2, lines 6 to 12), compositions, forging and heat treatment (i.e., normalizing) are clearly to be controlled. Only induction hardening lacks any suggestion to be controlled. This shows the clear intent of the author that induction heating at a heating temperature of 1150°C is quite a common treatment and that changing or selecting induction heating conditions are not considered in the art.

As already demonstrated, the heating temperature of carburizing hardening in US '105 does not suggest a heating temperature of induction hardening to one skilled in the art. Further, also as already demonstrated, selecting a heating temperature of final induction hardening of 800-950°C results in an unexpectedly fine size of (prior) austenite grain as shown in Fig. 2, when an appropriate

amount of Mo is contained. Therefore, even considering Asano, conducting induction hardening at heating temperature of 800-950°C and the unexpected results thereof are not obvious. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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